

# Joint Trauma System



## Frostbite and Immersion Foot Care

*Part of the Joint Trauma System (JTS) Clinical Practice Guideline (CPG) Training Series*



# Purpose



This CPG provides evidence–based guidance for the treatment of frostbite and immersion foot.

*Presentation is based on the JTS Frostbite and Immersion Foot Care CPG, 26 Jan 2017 (ID:59). It is a high-level review. Please refer to the complete CPG for detailed instructions. Information contained in this presentation is only a guideline and not a substitute for clinical judgment.*

# Agenda



- Background
- Summary
- Frostbite (Evaluation & Treatment)
- Immersion Foot (Evaluation & Treatment)
- Performance Improvement (PI) Monitoring
- References
- Appendices
- Contributors

## Cold Injury/Frostbite

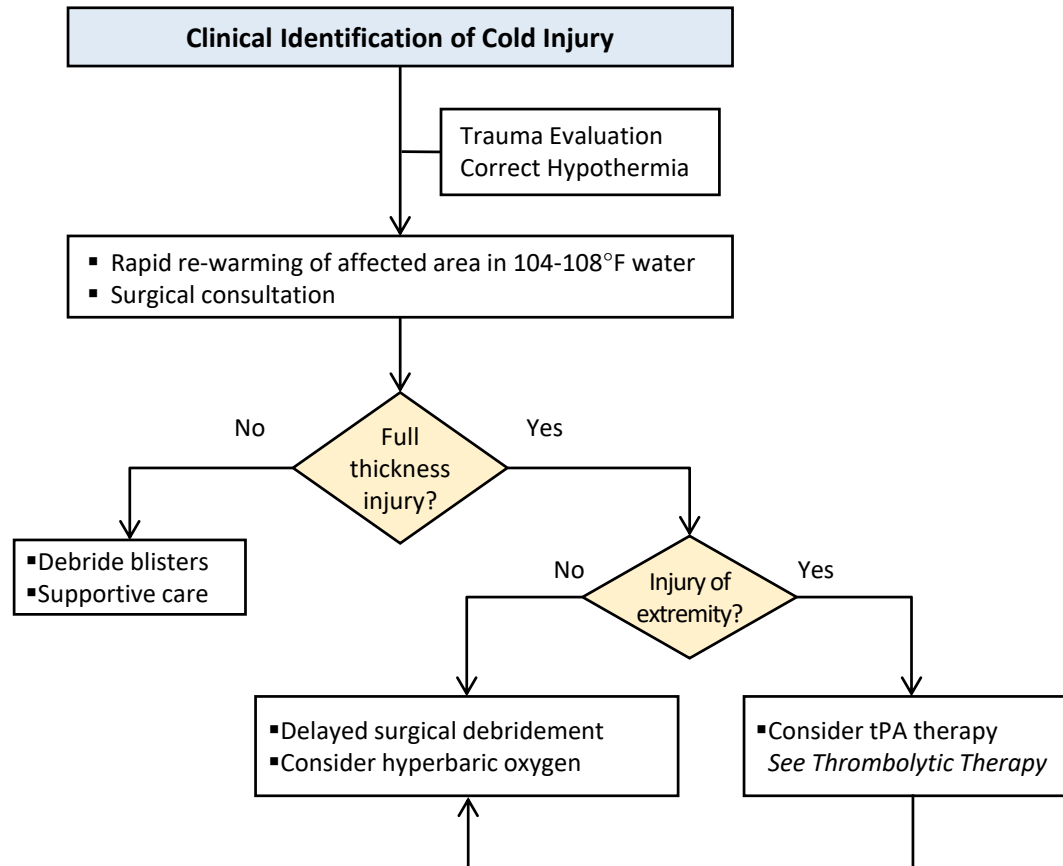
- Can also be described as superficial and full thickness similar to burns.
- Extent of injury is not easy to know immediately. The ultimate grade will not be known until treatment has been attempted and a period of time has passed.

# Summary



- Patients with frostbite should have the affected extremity rapidly rewarmed in 104-108°F water for 15-30 minutes.
- Thrombolytic therapy should be considered if available.
- Patients with immersion foot should be treated with dry heat.

# Summary



## ■ Risk factors for cold injury include a combination of

- ☐ Low absolute temperature
- ☐ Duration of exposure
- ☐ Racial background
- ☐ Smoking
- ☐ Altitude

# Evaluation: Cold Injury/Frostbite



## ■ Evaluation for Cold Injury/Frostbite

- ☐ Identification of injury
- ☐ Injury expected to have occurred when there is pain and swelling or gross signs of ischemia or skin injury

## ■ Evaluation includes:

- ☐ Standard trauma evaluation
- ☐ Identifying and correcting underlying hypothermia
- ☐ Preventing refreezing of suspected cold injury



# Frostbite Categories



## ■ 4 Broad Categories

- ☐ **1st Degree:** Superficial skin injury; pain on re-warming, numbness, hyperemia, occasional blue mottling, swelling and superficial desquamation (desquamation starts at about 5 days)
- ☐ **2nd Degree:** Partial thickness injury to skin; in addition to first degree findings, vesiculation of the skin surrounded by erythema and edema (appears around day 2)
- ☐ **3rd Degree:** Entire thickness of skin extending into subcutaneous tissue; bluish to black and nondeformable skin, hemorrhagic blisters, vesicles may not be present, eventual ulcerations can be expected; area will likely be surrounded by 1st or 2nd degree injury
- ☐ **4th Degree:** Similar to third degree, but full thickness damage including bone. Area may be cold to touch and may feel stiff or woody.

# Treatment: Frostbite



- Rapid rewarming at 104-108°F (40-42°C) for 15-30 minutes
  - ❑ Temperature is important. **DO NOT** just place in warm to touch water.
  - ❑ Warm water and verify temperature; too hot will cause burns.
- Liberal pain control is imperative with combination of narcotic and non-steroidal medications as rewarming will be very painful.
- No tobacco or nicotine
- Transfer to higher level of care when able for any full thickness injuries. Mild injury can likely be managed at site of injury.

# Treatment: Frostbite



## ■ Thrombolytic therapy

- ☐ Should be attempted within 24 hours of the start of injury for severe injuries with evidence of circulatory compromise (ischemic discoloration of distal digits/absent pulses, etc.).
- ☐ Should only be done at location capable of dealing with bleeding complications.

## ■ Additional measures can include

- ☐ Topical aloe vera
- ☐ Hyperbaric oxygen
- ☐ Whirlpool therapy with exercise

## ■ Surgical debridement *should not be performed* in the operational environment.

# Evaluation: Immersion Foot



## ■ Presentation

- ☐ Immersion foot is also known as trench foot.
- ☐ Water logging of the foot.
- ☐ Prolonged exposure results in hyperemic, mottled, painful and edematous foot which can progress into hypoperfusion, ulceration and gangrene.

## ■ Risk factors

- ☐ Continuous moist environment
- ☐ Low absolute temperature
  - Cold temperature: approximately 12 hours before onset
  - Warm temperature: approximately 48 hours before onset

# Treatment: Immersion Foot



## Treatment of Immersion Foot

- In contrast to frostbite, air dry extremity at room temperature.
- Do not routinely provide antibiotics, but if concerned for infection treat for streptococcal, staphylococcal and *P. aeruginosa* based on local antibiogram.
- Pain control and debridement of necrotic tissue may be required.

## ■ Intent (Expected Outcomes)

- ☐ When cold injury is identified, rapid re-warming of the affected tissue in 104-108°F water is expected as early as possible.
- ☐ Initiate thrombolytic therapy within 24 hours when appropriate.

## ■ Performance/Adherence Measures

- ☐ Re-warming of the affected tissue in 104-108°F water is expected immediately after evaluation.
- ☐ Thrombolytic therapy, if available and warranted, within 24 hrs.
- ☐ Prevent refreezing of warmed tissue.

## ■ Data Source

- ☐ Patient record
- ☐ Department of Defense Trauma Registry (DODTR)

# References



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# Appendices in CPG



- **Appendix A:** Clinical Identification of Cold Injury
- **Appendix B:** Additional Information Regarding Off-Label Uses in CPGs

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